DOCUMENT RESUME

ED 265 043 SE 046 344

AUTHOR Blueford, J. R.; And Others
TITLE K-6 Science Curriculum.
INSTITUTION Geological Survey (Dept. of Interior), Reston, Va.; Math Science Nucleus, Fremont, CA.
PUB DATE Dec 85
NOTE 21p.; For other documents in the curriculum see SE 046 345-350.
AVAILABLE FROM Math/Science Nucleus, 43000 Sumter Ave., Fremont, CA 94538 ($15.00 for complete curriculum).
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Biology; *Chemistry; Curriculum Design; Elementary Education; *Elementary School Science; *Geology; Interdisciplinary Approach; *Physics; Science Curriculum; Science Education; *Unified Studies Curriculum; Water

ABSTRACT

A unified science approach is incorporated in this K-6 curriculum mode. The program is organized into six major cycles. These include: (1) science, math, and technology cycle; (2) universe cycle; (3) life cycle; (4) water cycle; (5) plate tectonics cycle; and (6) rock cycle. An overview is provided of each cycle's major concepts. The topic emphasis for each grade level and cycle's sub-themes are presented in a matrix arrangement. (ML)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

K-6 SCIENCE CURRICULUM

ED265043

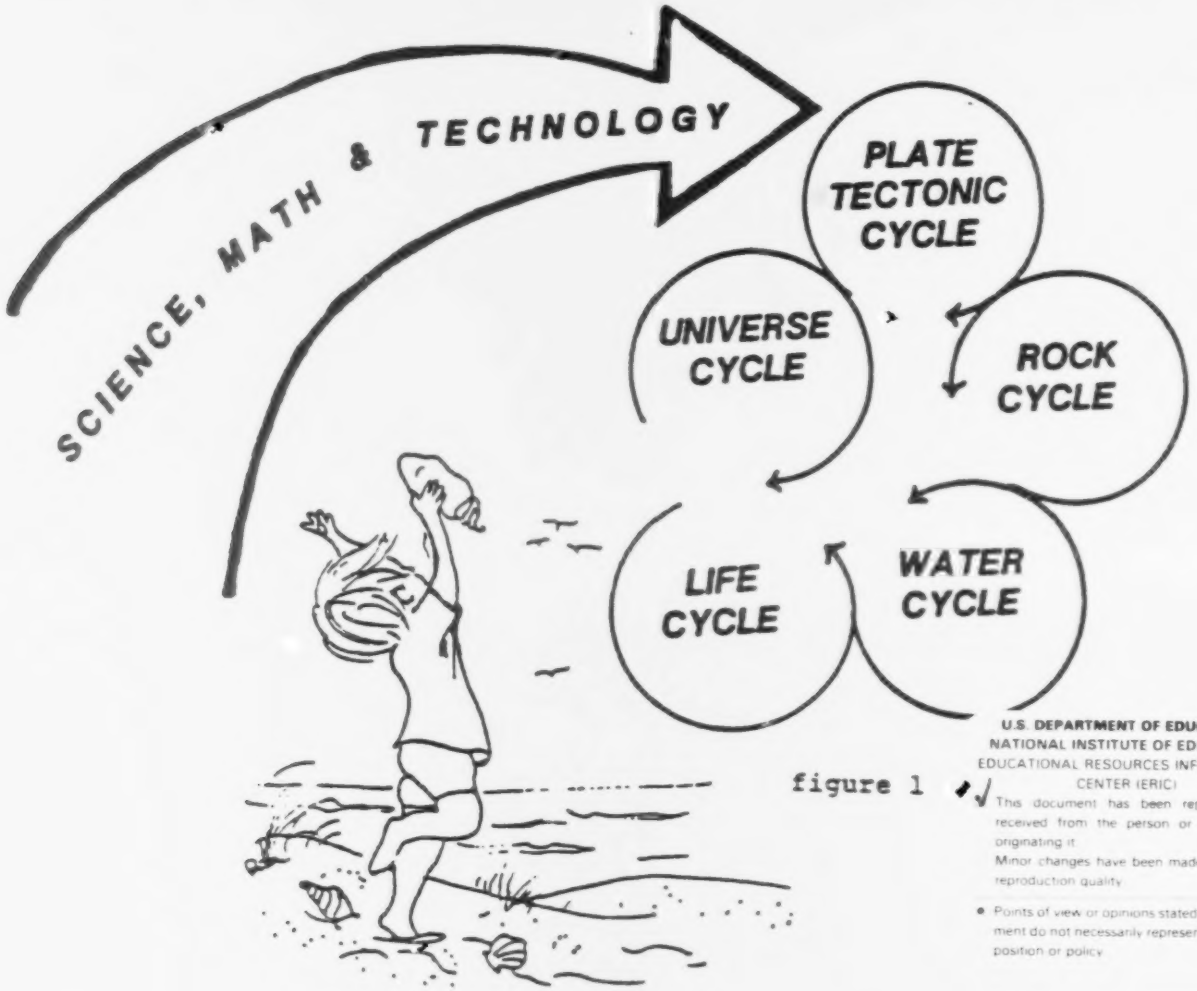

figure 1

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
Joyce R. Blueford
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

JOINT PROJECT
BY
MATH SCIENCE NUCLEUS
AND
U.S. GEOLOGICAL SURVEY
Revised December 1985

Science is important to humans. It is a subject that teaches critical thinking and problem solving in a very applied way. As illustrated above, a unified science curriculum for K-6th grades can be explained as a main current with five whirls or cycles. These five major cycles can be developed to teach children why science is important in understanding the world around them. Few people realize that the developing earth is a model for all sciences. The evolution of the universe gave birth to our solar system. This very formation of planets has created a unique situation on earth. The heating up of the earth's internal engine created movement within the earth's interior, expressed as volcanos on the surface, causing water in the form of gases to be released. The miracle of water created conditions for life to develop...and without water we could not survive as a planet. The earth and all its many cycles encompasses all parts of science: geology, biology, physics and chemistry.

SE.046344

SCIENCE, MATH & TECHNOLOGY

Science is a very diverse subject with both qualitative and quantitative aspects of learning. Science is not only composed of facts about our natural world but also includes discovery, comparsions and descriptions. These basic concepts should be learned before students fully understand the scientific method.

Technology is the applied side of science and math in industry. However, not all parts of science and math and their respective research can turn into technology. Commonly you hear the term "Research and Development" better known as R&D. This refers to the science and math that has the potiential of turning into an applied technology. Technology in the United States has an added factor, if it doesn't make money than it isn't a used technology. Technology is a very broad subject, that only the basics can be taught in the elementary schools. These units reflect an elementary child's world, and the technology that they are mostly familiar with. So, most of the items reflect the technology that toys are made of, household items and useful skills that children should begin to acquaint themselves with.

SCIENCE, MATH & TECHNOLOGY CYCLE

K	1	2	3	4	5	6	
A. What is that?	B. How do you tell about your discovery?	.....	C. Why is that different?	.....	D. Does it always happen that way?	E. What is the scientific method?	SCIENCE
A. What are numbers?	B. How do you recognize shapes?	.....		C. How do you plot data?	.....	E. What do graphs tell us?	MATH
A. What are simple machines?	.....	.....	B. Electricity	C. Magnetism	D. Waves	E. Forces	TECHNOLOGY
A. What is man-made?	B. What is wildlife?	C. Where does our garbage go?	D. How is land used?	E. Is our water and air safe?	F. Are there too many people?	G. How are cities made?	BUILT ENVIRONMENT

UNIVERSE CYCLE

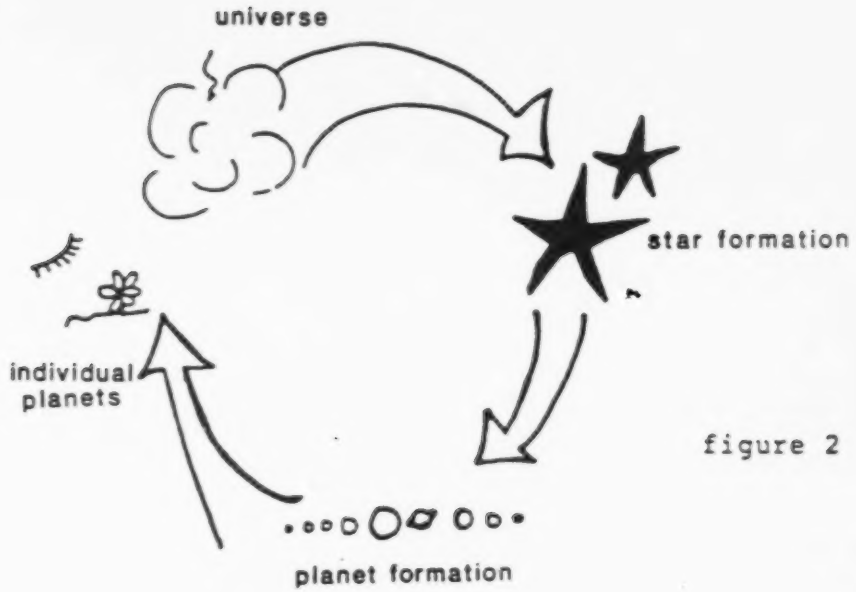

figure 2

The evolution of the solar system explains how the earth and other planets in our part of the galaxy were generated (figure 2). There are many theories but the most popular calls for the formation of a disc shaped interstellar cloud of gases and "dust" spinning in our part of the galaxy approximately 5 or 6 billion years ago. The main constituents of the cloud were primarily hydrogen and helium. Within the spinning nebula, cold dust and gases tended to concentrated and collide to form so-called "protoplanets." The orbits of these protoplanets were probably irregular, causing collisions that resulted in fewer but larger bodies or planets. Once planets formed they developed in their own way depending on how close they were to their star, how fast it spins on its axis, and how their internal structure works.

UNIVERSE CYCLE

K	1	2	3	4	5	6	
A. What's in the sky?	B. What is the the solar system?	.....	C. Does the earth move?	D. What is the universe?	.....	E. Is there a future in space?	UNIVERSE
A. Where are land and water?	.....	B. What is a map?	C. Where are places in my state?	D. Where are places in my country?	E. Where are places in the world?	F. Why are maps important?	GEOGRAPHY
A. Is the earth spherical?	B. Why is the earth unique?	C. Landforms created by water	D. Landforms created by ice	E. Landforms created by wind	.....	F. Why do we have mountains and valleys?	EARTH
A. What is natural?	.....	B. Who eats whom?	.....	C. What is an ecosystem?	D. What is the food web?	E. What is natural selection?	NATURAL ENVIRONMENT

PLATE TECTONIC CYCLE

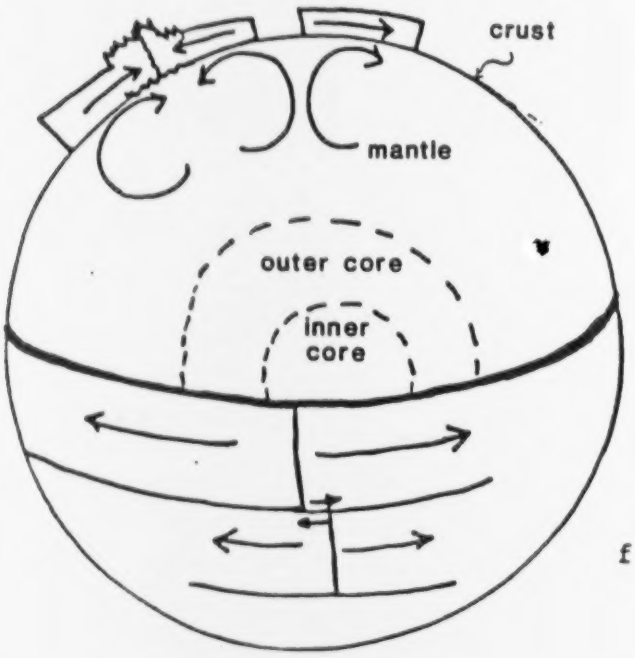

figure 3

The plate tectonic cycle is a recycling process on a grand scale (figure 3). The earth is dynamic, spinning on its axis as it revolves around the sun. The earth is restless inside, as it's interior tries to cool. Material inside the earth acts differently under high temperatures and pressures. Material becomes viscous and flows. Internal movement results in the movement of large masses of the crust called plates. Convection currents inside the mantle form 2 types of crust movement. When convection current move together, they form convergent boundaries on the crust. This pressure is released by internal movement, causing earthquakes and mountain building. For example, the formation of the Himalayan Mountains in India is the result of two continents colliding. When the convection currents pull the

crust apart divergent boundaries forms. Volcanoes heal the scar and earthquakes are generated because of the movement. The volcanoes in Iceland are creating new land as the plates are moving away from each other. Because the earth moves faster along the equator than at the poles differential movement causes the plates to move faster than others, resulting in breaks in the earth's crust called transform boundaries which cause earthquakes. The San Andreas in California is an example of such a break.

PLATE TECTONIC CYCLE

K	1	2	3	4	5	6	
A. How many types of volcanoes are there?	.....		B. Creating rocks from lava	C. Distribution of volcanoes	.....	D. Plotting where volcanoes are found?	VOLCANOES
A. Description of earthquakes	.....	B. What are waves?	.....	C. How can we measure earthquakes?	D. Wave movements and seismograms	E. Dividing the earth by waves	EARTHQUAKES
A. Do our continents fit together?	.....		B. Pressure in the earth	C. How are volcanoes/ earthquakes related?	D. How does our crust move?	.....	PLATE TECTONICS
A. Earthquake and volcano hazards	.....	B. Where do I go for help?	C. Historical damage (volcanoes)	D. Historical damage (earthquakes)	E. Hazardous areas	F. How strong are earthquakes?	HAZARDS

ROCK CYCLE

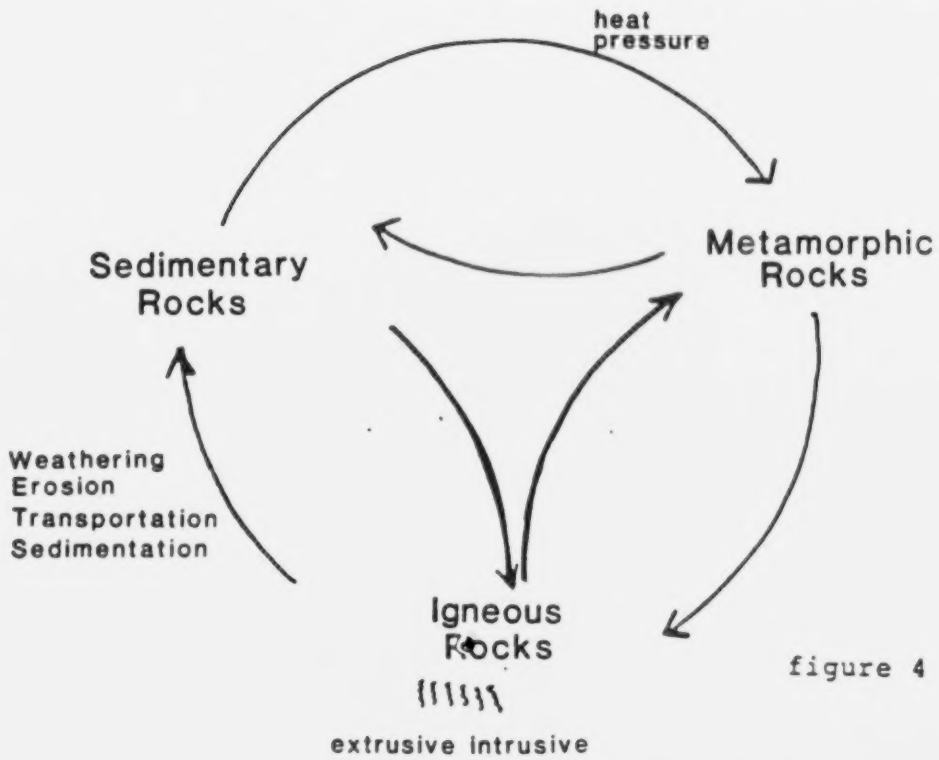

figure 4

The rock cycle illustrates how the earth recycles material (figure 4). Rocks are either formed from magma that cools down (igneous); or by the cementing together of particles (sedimentary) or by the changing of the chemical composition of pre-existing rocks by temperature and pressure (metamorphic). These different types of rocks can be remelted, eroded, transported and buried over and over again to form further generations of rocks.

ROCK CYCLE

K	1	2	3	4	5	6	
A. Observational skills	.....		B. Geometric shapes of minerals	C. Key Characteristics of rocks and minerals	.....		CHARACTERISTICS
A. What is matter?	B. What makes up matter?		C. What are elements?	D. What are compounds?	E. What is bonding?	.....	CHEMISTRY
A. Minerals are pretty		B. What is a mineral?	C. How do you recognize minerals?		D. Why are minerals important?	E. Molecules combine to make minerals	MINERALS
A. We live on rocks		B. What is a rock?	C. Three types of rocks		D. Environments that create rocks		ROCKS

WATER CYCLE

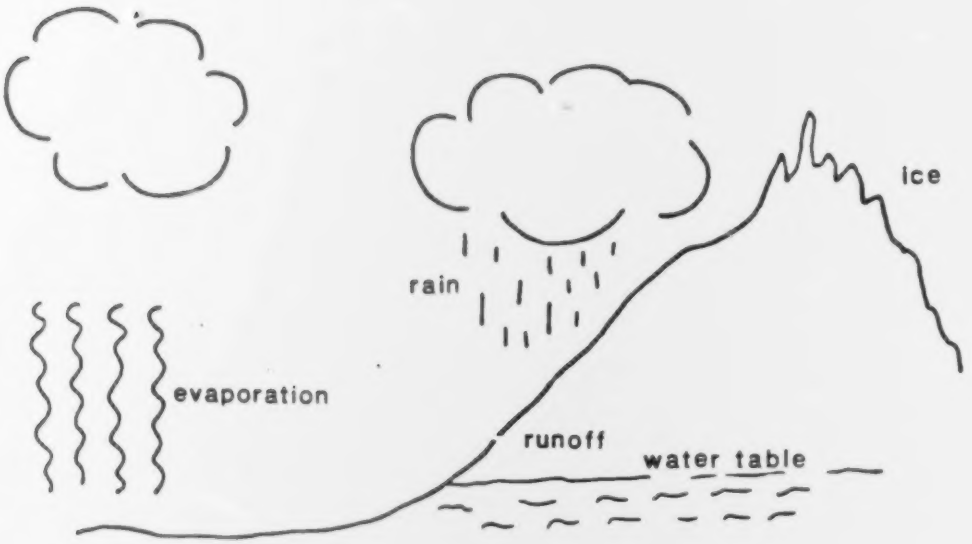

figure 5

The water cycle or hydrologic cycle (figure 5) is a major driving force in operation on our planet. Water is in constant motion, evaporating into the atmosphere from oceans, lakes, rivers and streams. When the atmosphere can no longer contain the water we experience rain, snow, hail or sleet. Some water is locked in the form of ice at the polar caps and in alpine glaciers. Water is returned to the system through drainage, which results from the melting of snow that accumulated during the winter months. This water flows on the surface of the earth and percolates through the earth as the water table.

WATER CYCLE

K	1	2	3	4	5	6	
A. What is a liquid?	B. What is water?	.....	C. Water cycle	E. Why are oceans salty?	D. Why is water important?	.....	WATER
A. Where are the oceans?	B. How big are the oceans?	C. What is an ocean?	.....	D. Where are the major oceans?	E. Why is the ocean important?	F. How does water move?	OCEANS
A. Can states of matter change?	.....		B. What is in the air?	C. How does the air move?	.....	D. Why is the atmosphere important?	ATMOSPHERE
A. What is weather?	B. What makes weather?	C. What causes weather?	.....	D. What is climate?	E. What causes seasons?	E. Climate & weather patterns	WEATHER

LIFE CYCLE

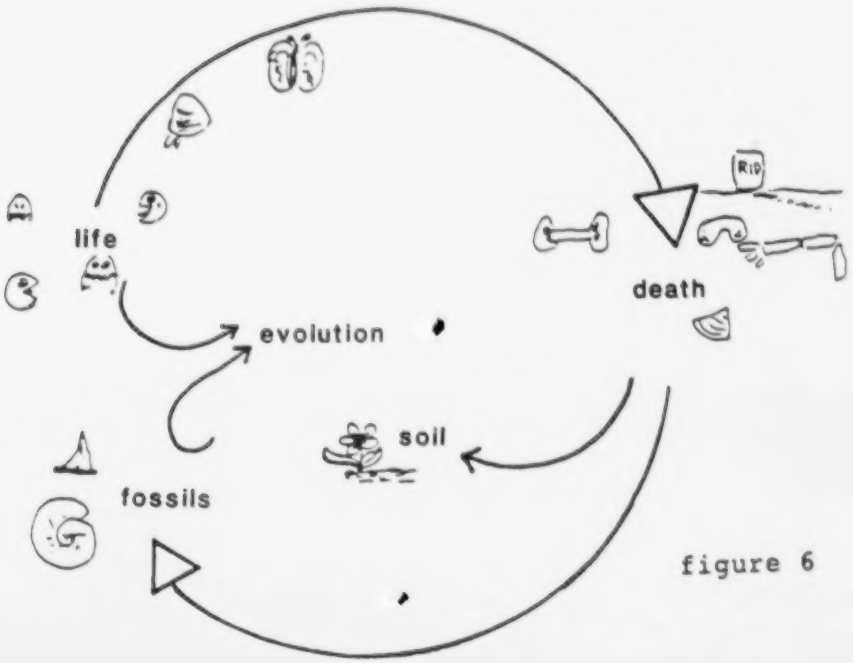

figure 6

The life cycle (figure 6) is very important to humans, and usually is emphasized in elementary grades. However, life as we know it, could not exist without the previous cycles. The various theories on how life began, depends on molecules derived from gases during the creation of the primoridal atmosphere. An integral part of life includes the food chain which illustrates the way organisms eat to survive. No matter how life was generated, death of all organisms is inevitable. Their death releases organic carbon that becomes available in soil, which helps create suitable conditions for plants to grow. Death and subsequent burial helps preserve the hard parts of organisms which allows scientists to discover fossils and interpret how they evolved through time. The past gives clues on the type of organisms that lived on this planet. Present life gives us insight as to on what the past looked like.

LIFE CYCLE

K	1	2	3	4	5	6	
A. What is life?	.....	B. Organisms with backbones	C. Organisms without backbones	D. Building blocks of life	E. Animal reproduction	F. How is life classified?	ANIMAL LIFE
A. What are dinosaurs?	.....	B. Bone fossils	C. Fossils without backbones	D. Other fossils	E. How are fossils preserved?	F. Why are fossils important?	PAST LIFE
A. What are plants?	B. Plant parts	.....	C. How do plants grow?	.....	D. Are plants important?	F. What is photosynthesis?	PLANT LIFE
A. Body parts	B. The senses	C. How do we grow?	.....	D. Human body systems	.....	E. What are diseases?	HUMAN BIOLOGY